

ABSTRACT OF THE DISCLOSURE

The invention provides methodologies and apparatus for producing devitalized soft-tissue implants where the implant retains metabolically non-viable and/or reproductively non-viable cells, and preferably retains large molecular weight cytoplasmic proteins, such implants produced both in small quantities and in commercializable quantities. Such soft-tissue implants include vascular graft substitutes. A devitalized graft is produced by subjecting the tissue sample to an induced pressure mediated flow of an extracting solution, optionally followed by inducing a pressure mediated flow of a salt solution, then washing the tissue to produce the devitalized graft. The devitalized grafts produced are uniform and non-immunogenic. The inventive method allows for the production of multiple devitalized soft tissue implants, where processing time is significantly less than prior art processes and the number of implants produced per day is increased over prior art processes. In clinical use, the devitalized grafts produced exhibit significantly improved in long-term durability and function, and enhanced recellularization post-implantation.